Complete Summary

GUIDELINE TITLE

The assessment and management of cardiovascular risk.

BIBLIOGRAPHIC SOURCE(S)

New Zealand Guidelines Group (NZGG). The assessment and management of cardiovascular risk. Wellington (NZ): New Zealand Guidelines Group (NZGG); 2003 Dec. 190 p. [705 references]

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Cardiovascular disease, including angina, myocardial infarction, coronary death, ischaemic stroke, transient ischaemic attack, and peripheral vascular disease

GUIDELINE CATEGORY

Diagnosis
Management
Risk Assessment
Treatment

CLINICAL SPECIALTY

Cardiology
Family Practice
Internal Medicine
Pulmonary Medicine

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Dietitians
Health Care Providers
Nurses
Pharmacists
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

To provide an evidence-based summary of effective practice in the assessment and management of cardiovascular risk

TARGET POPULATION

People in New Zealand with known cardiovascular disease or who are at risk of developing cardiovascular disease, including people with type 1 and type 2 diabetes

INTERVENTIONS AND PRACTICES CONSIDERED

Risk Assessment/Diagnosis

1. Risk assessment
    - Patient personal and/or family history including diabetes
    - Fasting lipid profile
    - Fasting plasma glucose
    - Body mass index or waist circumference measurements
    - Blood pressure measurements
    - Uric acid level, renal and liver-function tests
    - Oral glucose tolerance test and glycated hemoglobin (HbA1c)

Treatment/Management

1. Risk reduction strategies
    - Smoking cessation
        - Nicotine replacement therapy
        - Bupropion or nortriptyline hydrochloride therapy
    - Cardioprotective and weight loss dietary modification including supplements
    - Physical activity
    - Weight management
        - Dietary, physical activity, pharmacological, and surgical interventions
    - Lipid modification and blood pressure lowering
        - Drug interventions
            - Aspirin
            - Beta-blockers

        - Statins
        - Angiotensin-converting enzyme (ACE)-Inhibitors
        - Fibrate or combination therapy
        - Low-dose thiazide diuretic (blood pressure lowering only)
        - A2 receptor-blocker (blood pressure lowering only)
        - Warfarin (blood pressure lowering only)
    - Dietary intervention and alcohol consumption reduction
- Antiplatelet therapy
    - Aspirin
- Complementary and alternative therapies

2. After myocardial infarction and stroke
    - Drug treatment
        - Aspirin
        - Clopidogrel
        - Dipyridamole
        - Warfarin
        - Beta-blockers
        - ACE-inhibitors
        - Statins
        - Antiarrhythmic therapy
        - Hormone replacement therapy
        - Rate-limiting non-dihydropyridine calcium channel blockers
        - Nitrates
    - Computed tomography (CT) scan
3. Awareness of issues specific to cardiovascular health of Maori and Pacific Peoples

MAJOR OUTCOMES CONSIDERED

- Cardiovascular disease-associated morbidity and mortality
- Effectiveness of risk reduction strategies
- Cost effectiveness

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The Guideline Development Team took a pragmatic approach to the development of this guideline. Several evidence-based guidelines were available internationally and all had been rigorously and systematically developed. A process for adapting overseas guidelines was agreed. The quality of the international guidelines was to be assessed, and relevant sections of these international guidelines reviewed. Where issues were identified that were not covered by previous guidelines, new

searches were either commissioned from the New Zealand Health Technology Assessment (NZHTA), or were performed by the New Zealand Guidelines Group (NZGG).

New Literature Searches

New literature searches were completed in three ways:

- Evidence tables were commissioned from New Zealand Health Technology Assessment (NZHTA). Searches were undertaken, the studies were appraised using the Generic Appraisal Tool for Epidemiology (GATE), and the results were presented in evidence tables.
- Searches by the project manager identified other papers and literature published since 2001, and these were appraised independently. The cut-off for new evidence for systematic searches was February 2003.
- Systematic reviews and meta-analyses published since 1999 were presented for review by the Guideline Development Team.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

1++

High quality meta-analyses, systematic reviews of randomised controlled trials (RCTs), or RCTs with a very low risk of bias

1+

Well conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias

1-

Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias

2E

An economic evaluation that has used local data (in this case from New Zealand) with level 1 evidence on effectiveness of interventions from well conducted meta-analyses or RCTs

2++

High quality systematic reviews of case-control or cohort studies

High quality case-control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal

2+

Well-conducted case-control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal

2-

Case-control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal

3

Non-analytic studies (e.g., case reports, case series)

4

Expert opinion

Appraisal of Other Guidelines

The international guidelines were appraised for the quality of their methodologies, using the AGREE appraisal instrument. All the guidelines listed in the evidence tables were assessed as being well developed and suitable for adaptation to New Zealand circumstances. The topic areas common to the proposed cardiovascular guideline and other existing international lipid, blood pressure, and diabetes guidelines were identified and reviewed and the recommendations compared.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The Guideline Development Team first met in March 2002, and had five face-to-face meetings and several subgroup teleconferences.

The reviews, summary evidence tables, and tables returned by New Zealand Health Technology Assessment (NZHTA) were reviewed by the Guideline Development Team, and a considered judgment process was used to agree on levels of evidence and draft recommendations.

The statements and recommendations were drafted, reviewed, and revised by sub-groups and then by the whole team. Resources and appendices were drafted in the same way. This process continued until the draft document was at an appropriate stage for peer review and consultation.

The dietary sections were authored separately using evidence prepared in tables and the draft reviewed by the Dietary Interventions Subgroup and others from the main Guideline Development Team.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Levels of Recommendations

A

The recommendation is supported by good evidence.

B

The recommendation is supported by fair evidence.

C

The recommendation is supported by non-analytic studies or consistent expert opinion.

I

The evidence is insufficient, evidence is lacking, of poor quality, or opinions conflicting, the balance of benefits and harms cannot be determined.

Good Practice Point

Recommended practice based on the professional experience of the Guideline Development Team

COST ANALYSIS

Refer to "Appendix B: Cardiovascular Risk Screening and Lipid-Lowering Treatment in their Economic Context" in the original guideline document.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The draft of this guideline was widely distributed to many organisations including consumer groups, primary health organisations, district health boards (DHBs), service and provider organisations, expert reviewers, clinicians, and other health care practitioners for comment as part of the consultation and peer review process.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Definitions for the Levels of Evidence (1++ to 4) and Grades of Recommendation (A - C, I, and Good Practice Points [GPP]) are given at the end of the "Major Recommendations" field.

Cardiovascular Risk Assessment

Who Should Be Assessed

C: Cardiovascular risk assessments are recommended:

- from the age of 45 years for asymptomatic men without other known risk factors
- from the age of 55 years for asymptomatic women without other known risk factors.

C: Cardiovascular risk assessments are recommended 10 years earlier for Maori (from the age of 35 years for men and 45 years for women).

C: Cardiovascular risk assessments are recommended 10 years earlier for Pacific peoples and people from the Indian subcontinent (from the age of 35 years for men and 45 years for women).

C: Cardiovascular risk assessments are recommended annually from the time of diagnosis for people with diabetes.

C: Cardiovascular risk assessments are recommended:

- from the age of 35 years for men with other known cardiovascular risk factors or at high risk of developing diabetes
- from the age of 45 years for women with other known cardiovascular risk factors or at high risk of developing diabetes.

These people will have one or more of the following risk factors:

- family history of premature cardiovascular disease in a first-degree male relative (parent or sibling) under 55 years or female relative under 65 years
- family history of diabetes in a first-degree relative (parent or sibling)
- personal history of gestational diabetes
- personal history of polycystic ovary syndrome
- personal history of current or recent smoking
- prior blood pressure of more than 160/95 mm Hg*
- prior total cholesterol to high-density lipoprotein (TC:HDL) ratio of more than 7*
- known impaired glucose tolerance (IGT) or impaired fasting glucose (IFG) (see Table 22 in the original guideline document)
- obesity (body mass index [BMI] $\geq$30*) or truncal obesity (waist circumference $\geq$100 cm* in men or $\geq$90 cm* in women)

C: All those with cardiovascular disease should have comprehensive risk factor measurements to determine the best management approach.

C: Tracing the siblings and children of index cases known to have a genetic lipid disorder is the recommended method of identifying individuals with genetic lipid disorders.

*Where risk factor thresholds are given these should be interpreted as approximate guides to clinical practice only.

Who Should Do the Assessment

C: Risk assessments should be provided at the primary care level by health practitioners with appropriate training, infrastructure support, systems for follow-up, and systems that improve quality.

Frequency of Cardiovascular Risk Assessment

C: People with a 5-year cardiovascular risk under 5% should have a further cardiovascular risk assessment in 10 years.

C: People with a 5-year cardiovascular risk between 5 and 15% should have a further cardiovascular risk assessment in 5 years.

C: Annual cardiovascular risk assessments are recommended in people with:

- a 5-year cardiovascular risk greater than 15%
- diabetes
- people receiving treatment with lipid-modifying or blood-pressure-lowering medication

C: People with diabetes or receiving medication or intensive lifestyle advice may need individual risk factor measurements taken more frequently (e.g., monitored 3 monthly until controlled, then every 6 months).

Treatment Decisions

A: All treatment decisions should be based on an individual´s 5-year absolute cardiovascular risk.

C: Everyone with risk factors should be involved in the decision-making process regarding their treatment.

C: The higher an individual´s absolute risk of a cardiovascular event, the more aggressive management should be.

A: Everyone with a history of a cardiovascular event and any risk factor above optimal levels should be considered for treatment to reduce their cardiovascular risk. Treatment should aim to lower the risk factors to optimal levels.

C: Everyone with isolated very high-risk factor levels, either a total cholesterol greater than 8 mmol/L or a TC:HDL ratio greater than 8 or blood pressure greater than 170/100 mm Hg should have drug treatment and specific lifestyle advice to lower risk factor levels.

A: Everyone with the specific genetic lipid disorders (familial hypercholesterolaemia, familial defective ApoB, or familial combined dyslipidaemia) or diabetes with overt nephropathy should be considered for treatment to reduce their cardiovascular risk. Treatment should aim to lower the risk factors to optimal levels.

A: Everyone with cardiovascular disease, a 5-year cardiovascular risk of greater than 20%, genetic lipid disorders, diabetes, or the metabolic syndrome should receive intensive lifestyle advice. Lifestyle changes that have been shown to benefit people with these risk profiles include:

- dietary change (A)
- smoking cessation (A)
- physical activity (B)

A: Intensive dietary advice should be given in individual/group sessions with a dietitian.

C: People with a 5-year cardiovascular risk greater than 20% should receive intensive lifestyle advice and drug treatment of all modifiable risk factors simultaneously.

C: People with a 5-year cardiovascular risk of between 15 and 20% are likely to need treatment of all modifiable risk factors. Specific lifestyle advice may be given for 3 to 6 months prior to drug treatment.

C: Among people with a 5-year cardiovascular risk greater than 15%, the aim of treatment is to lower 5-year cardiovascular risk to less than 15%.

B: People with a 5-year cardiovascular risk between 10 and 20% should receive specific lifestyle advice on a healthy cardioprotective dietary pattern, physical activity, and smoking cessation from their primary health care team. This advice should be followed for 3 to 6 months prior to considering drug treatment.

C: People with a 5-year cardiovascular risk of less than 15% should receive nonpharmacological approaches to treating multiple risk factors.

B: People with a 5-year cardiovascular risk of less than 10% should receive general lifestyle advice on a healthy cardioprotective dietary pattern, physical activity, and smoking cessation.

GPP: The order in which to start interventions should take into account individual risk factor profiles, potential side effects, other concurrent illness, compliance, personal preference, and cost. It is appropriate to treat multiple risk factors simultaneously.

Intervention: Cardioprotective Dietary Patterns

A: Dietary intervention is strongly recommended as an integral component of the management of cardiovascular risk.

A: Use behavioural and motivational strategies in education and counselling to achieve and sustain dietary change.

A: Everyone with cardiovascular disease, a 5-year cardiovascular risk of greater than 20%, genetic lipid disorders, diabetes, or the metabolic syndrome should receive intensive lifestyle advice. Lifestyle changes that have been shown to benefit people with these risk profiles include:

- dietary change (A)
- smoking cessation (A)
- physical activity (B)

A: Intensive dietary advice should be given in individual/group sessions with a dietitian.

A: Everyone with a 5-year cardiovascular risk between 10 and 20% should receive specific lifestyle advice on a cardioprotective dietary pattern, physical activity, and smoking cessation from their primary health care team. This advice should be followed for 3 to 6 months prior to considering drug treatment and continued for life.

GPP: People with a 5-year cardiovascular risk of less than 10% should receive general lifestyle advice on a cardioprotective dietary pattern, physical activity, and smoking cessation.

A: Everyone should be encouraged to adopt a cardioprotective dietary pattern that includes fruit and vegetables, whole grains, fish and/or dried peas and beans or soy products, oil, margarine spreads, nuts or seeds, very low-fat milk products, and optional small servings of lean meat or skinned poultry. This dietary pattern avoids regular consumption of foods prepared with meat or dairy fats.

B: A cardioprotective diet in people with type 2 diabetes who are overweight or obese should be tailored to promote weight loss.

A: Fish oil supplements, 1 g/day eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) combined, may be offered post myocardial infarction.

A: The use of antioxidant supplements is not recommended for the prevention or treatment of cardiovascular disease.

GPP: Individualise dietary counselling and other lifestyle changes to complement prescribed risk factor modifying pharmacological agents to assist the individual in reducing their absolute risk of cardiovascular disease.

Intervention: Physical Activity

B: Everyone should aim to do a minimum of 30 minutes of moderate intensity physical activity (3 to 6 metabolic equivalents [METs]) on most days of the week.

B: For people with time constraints this physical activity may be accumulated in bouts of 8 to 10 minutes.

B: People who are already doing 30 minutes of moderate-intensity physical activity per day should be encouraged to do physical activity of higher intensity or for longer to increase the beneficial effect by further improving their cardiorespiratory fitness.

B: Physical activity is an integral part of the lifestyle advice for people with increased cardiovascular risk.

B: Individuals with a history of cardiovascular disease should consult their doctor before they undertake vigorous physical activity. Vigorous activity is generally not encouraged in people with impaired left ventricular function, severe coronary artery disease, recent myocardial infarction, significant ventricular arrhythmias, or stenotic valve disease.

C: Physical activity for people with coronary heart disease should begin at a low intensity and gradually increase over several weeks.

Intervention: Weight Management

B: Measure BMI and waist circumference as part of a comprehensive cardiovascular risk assessment.

B: The immediate priorities in weight management are to prevent weight gain, to achieve and sustain moderate weight loss (5 – 10%) where appropriate, and to increase physical fitness.

B: Encourage people with a 5-year cardiovascular risk above 15% or with diabetes and a BMI greater than 25 (especially anyone who has a BMI >30) to commence graduated lifestyle change aimed at weight reduction.

A: For significant weight loss, recommend a reduction in energy intake and an increase in physical activity.

C: Discourage the use of weight loss programmes that promote the exclusion of food groups from the cardioprotective dietary pattern or that increase saturated fatty acid intake.

GPP: Consider referral to weight management health care practitioners for motivational counselling or specific energy balance assessment and advice when general lifestyle advice does not achieve a sustained weight loss.

GPP: Appropriate equipment is required to assess the cardiovascular risk in people who are overweight or obese.

GPP: Review the indication for use of drugs that cause weight gain. Offer weight management support to people requiring drugs that cause weight gain.

GPP: Only initiate pharmacological interventions as an adjunct to a comprehensive weight management programme that includes diet and physical activity and uses motivational and behavioural methods.

GPP: Surgery may be considered for people with a BMI greater than 40. Decisions should take into account both the absolute cardiovascular risk and other health risks and comorbidities.

Intervention: Smoking Cessation

A: All smokers should be encouraged to stop smoking. Smoking cessation has major and immediate health benefits for smokers of all ages.

GPP: The recording of current and past smoking habits is recommended as part of a comprehensive cardiovascular risk assessment.

A: Nicotine replacement therapy (NRT) is recommended as first-line pharmacotherapy for smoking cessation in New Zealand. Bupropion or nortriptyline hydrochloride are alternatives and recommended as second-line agents.

C: Use NRT cautiously (after discussion with a specialist) in the immediate post-myocardial infarction period (4 weeks) and in those with serious arrhythmias or severe or worsening angina.

C: Nortriptyline hydrochloride is contraindicated during the acute recovery period after myocardial infarction.

Intervention: Lipid Modification

Management of Lipid Abnormalities

C: The higher the calculated cardiovascular risk, the more aggressive the management of modifiable risk factors, including lipids, should be.

A: People presenting after an acute cardiac event (myocardial infarction or unstable angina) should start treatment with a statin simultaneously with

intensive lifestyle advice. Treatment should aim to lower low-density lipoprotein cholesterol (LDL-C) to less than 2.5 mmol/L.* This should be given in association with other appropriate medication such as aspirin, a beta-blocker, and an angiotensin-converting enzyme (ACE)-inhibitor.

C: Lipids should ideally be measured at the time of the acute event. Since the metabolic disturbance continues for 10 to 12 weeks after a myocardial infarction, further measurements should be deferred for three months.

C: People presenting after an acute cardiac event with hypertriglyceridaemia and a low HDL-C should be considered for a fibrate or combination therapy.

A: In people with venous coronary artery bypass graft (CABG), treatment should aim to lower the total cholesterol to less than 3.5 mmol/L and LDL-C to less than 2.0 mmol/L.*

B: Most people presenting after an ischaemic stroke or transient ischaemic attack should start treatment with a statin.

C: Everyone with a total cholesterol greater than 8 mmol/L or TC:HDL ratio greater than 8* should have drug treatment and specific lifestyle advice to lower risk factor levels.

B: Within the range of total cholesterol 4 to 8 mmol/L, all decisions to treat should be based on the individual´s cardiovascular risk.

B: People with low HDL-C and elevated triglycerides with a 5-year cardiovascular risk greater than 15% should be treated with intensive lifestyle interventions and are likely to need treatment with a fibrate or combination drug therapy.

A: A cardioprotective dietary pattern is strongly recommended as an integral component of lipid management.

B: Dietary advice should be tailored to the individual´s risk factor and lipid profile.

B: Among people with a 5-year cardiovascular risk greater than 15% the aim of treatment is to lower 5-year cardiovascular risk to less than 15%.

C: LDL-C should be used as the primary indicator of optimum lipid management and should be used to monitor lipid-modifying treatment.

*Note: Where risk factor thresholds are given these should be interpreted as approximate guides to clinical practice only.

Dietary Interventions for Lipid Modification

A: Dietary intervention is strongly recommended as an integral component of the management of blood cholesterol and lipids.

A: Advise a cardioprotective dietary pattern rich in plant foods including fruits, vegetables, dried peas and beans including soy, whole grains and other

appropriately processed cereals, suitable plant oils, nuts, and seeds. This eating pattern may include plant sterol or stanol-fortified spreads and regular use of oily fish.

A: Assist the individual in identifying and choosing foods which are low in saturated fatty acids, transunsaturated fat, and dietary cholesterol.

A: People who are overweight or obese should be offered appropriate weight loss interventions.

A: Identify excessive alcohol intake and advise reduction or substitution with non-alcoholic beverages.

GPP: Individualise nutritional counselling and other lifestyle changes to complement prescribed risk factor modifying pharmacological agents to reduce absolute cardiovascular risk.

Treatment Monitoring and Duration

GPP: For people prescribed intensive lifestyle therapy or lipid-lowering medication, lifelong treatment is recommended.

C: Lipid monitoring is recommended for those on lipid-lowering drug treatment every 3 months until levels are controlled, then every 6 months.

GPP: A baseline transaminase level (ALT) should be taken prior to initiating statin medication. A baseline ALT and creatinine should also be taken prior to initiating fibrate medication. A second ALT should be taken at the time of the first follow-up, and thereafter if indicated clinically.

GPP: Creatine kinase should be requested for people who have definite unexplained muscle symptoms.

C: Lipids should be measured when people present acutely at the time of a myocardial infarction. Further measurements should be deferred until 3 months.

Intervention: Blood Pressure Lowering

Management of Blood Pressure

C: The higher the calculated cardiovascular risk, the more aggressive the management of modifiable risk factors, including blood pressure, should be.

A: People presenting after an acute myocardial infarction should be considered for a beta-blocker and ACE-inhibitor regardless of blood pressure level, concurrently with intensive lifestyle advice. This should be given in association with other appropriate medication, such as aspirin and a statin.

A: People presenting after an acute ischaemic stroke or transient ischaemic attack should start blood pressure lowering medication unless the person has symptomatic hypotension. This medication should be given in addition to other

appropriate medication such as aspirin, a statin, or warfarin, if indicated. Treatment should start concurrently with intensive lifestyle advice. It is usually advisable to wait 7 to 14 days before starting blood pressure lowering medication.

C: Everyone with blood pressure consistently greater than 170/100 mm Hg should have drug treatment and specific lifestyle advice to lower risk factor levels.

B: Within the blood pressure range 115/70 to 170/100 mm Hg, all decisions to treat should be based on the individual´s cardiovascular risk.

A: A cardioprotective dietary pattern is strongly recommended as an integral component of blood pressure management.

B: Dietary advice should include the limitation of both alcohol (see Table 6 in the original guideline document) and sodium consumption.

B: Among people with a 5-year cardiovascular risk greater than 15% the aim of treatment is to lower 5-year cardiovascular risk to less than 15%.

A: A low-dose thiazide diuretic is the drug of first choice in those without contraindications.

A: Intensive blood pressure management is required (with early consideration of an ACE inhibitor) in all people with diabetes due to the increased risk of renal complications.

B: More than one drug is frequently required to lower blood pressure to optimum levels.

A: Aggressive blood pressure control is indicated in people with diabetes and overt nephropathy, or diabetes and microalbuminuria, or diabetes and other renal disease.

A: People with diabetes and overt nephropathy or diabetes and confirmed microalbuminuria should be started on an ACE-inhibitor or A2 receptor-blocker (if there are no contraindications) irrespective of blood pressure levels.

A: Most of the treatment benefit is achieved by reaching the following blood pressure levels:

- 140/85 mm Hg* in people without clinical cardiovascular disease
- 130/80 mm Hg* in people with diabetes or cardiovascular disease

GPP: A blood pressure lower than 130/80 mm Hg is preferable for people with diabetes and overt nephropathy or diabetes with other renal disease.

*Note: Where risk factor thresholds are given these should be interpreted as approximate guides to clinical practice only.

Dietary Interventions for Blood Pressure Lowering

A: Dietary intervention is strongly recommended as an integral component of the management of elevated blood pressure.

A: Advise an eating plan low in total fat, saturated fatty acids, and dietary cholesterol, and rich in fruits, vegetables, and low-fat dairy products.

A: People who are overweight or obese should be offered appropriate weight loss interventions.

A: Identify excessive alcohol intake and advise reduction or substitution with non-alcoholic beverages.

A: Assist the individual to reduce sodium intake to no more than 2 g per day (6 g sodium chloride).

GPP: Individualise nutritional counselling and other lifestyle changes to complement prescribed risk factor modifying pharmacological agents to reduce cardiovascular risk.

Monitoring and Duration of Treatment

GPP: Lifelong treatment is advised for people prescribed medication or intensive lifestyle advice.

GPP: Side effects of blood pressure lowering treatment are uncommon, but the possibility of drug-specific unwanted effects should be discussed prior to treatment.

GPP: For those on drug treatment, blood pressure monitoring is recommended every 3 months until the blood pressure is controlled, then every 6 months. Ongoing monitoring of creatinine and electrolytes is advisable for people with high initial values, persistent elevated blood pressure or in those taking diuretics, ACE-inhibitors, or A2 receptor-blockers.

GPP: People with diabetes who are receiving medication should have their blood pressure monitored every 3 months until adequate control is achieved, then every 6 months.

Intervention: Antiplatelet Therapy

Antiplatelet Therapy for People without Clinical Cardiovascular Disease

A: Everyone with a 5-year cardiovascular risk greater than 15% should be started on low-dose aspirin (75–150 mg/day) if there are no contraindications.

A: Aspirin is contraindicated in people with aspirin allergies or intolerance, active peptic ulceration, and uncontrolled blood pressure and in people with other major bleeding risks.

Intervention: Complementary and Alternative Therapies

GPP: Clinicians should enquire about the use of alternative and complementary medicines when assessing cardiovascular risk or prescribing medication.

I: There is insufficient evidence to recommend the following complementary and alternative therapies for the treatment or prevention of cardiovascular disease:

- herbal medicines, botanicals (Lin et al., 2001)
- garlic (Banerjee & Maulik, 2002; Beaglehole, 1996; Neil et al., 1996)/ginkgo biloba/rosemary/horse-chestnut seeds/xin bao
- acupuncture (Lin et al., 2001)
- chelation (Villarruz, Dans, & Tan, 2002)
- oriental medicine
- aromatherapy
- homeopathy
- hypnosis
- meditation
- yoga/tai chi
- intercessory prayer (Aviles et al., 2001)
- Strauss heart drops

C: Feverfew, garlic, ginkgo biloba, ginger, and ginseng may alter bleeding time and should not be used concomitantly with warfarin (Miller, 1998).

C: St John´s Wort reduces serum digoxin levels and can enhance the metabolism of warfarin (Ernst, 1999).

C: Herbs (e.g., karela and ginseng) may affect blood glucose levels and should not be used in people with diabetes mellitus (Miller, 1998).

Management of People with Diabetes, Hyperglycaemic States, or the Metabolic Syndrome

Reducing Cardiovascular Risk

C: The higher the calculated cardiovascular risk, the more aggressive the management of modifiable risk factors, including diabetes, should be.

C: Everyone with diabetes should be offered risk factor treatment to lower their 5-year cardiovascular risk to less than 15%. Where possible treatment should aim to achieve optimal levels: LDL-C less than 2.5 mmol/L, blood pressure less than 130/80 mm Hg, glycated hemoglobin (HbA1c) less than 7%.

A: Everyone with diabetes or the metabolic syndrome should receive intensive lifestyle advice. Lifestyle changes that have been shown to benefit people with these risk profiles include:

- dietary change (A)
- smoking cessation (A)
- physical activity (B)

A: Intensive dietary advice should be given in individual/group sessions with a dietitian.

A: A cardioprotective dietary pattern is strongly recommended as an integral component of diabetes management.

B: The optimal level of HbA1c is as close to physiological levels as possible, preferably less than 7% for most people.

A: Due to the increased risk of renal complications, intensive blood pressure management is required (with early consideration of an ACE-inhibitor) in all people with diabetes.

B: More than one drug is frequently required to lower blood pressure to optimum levels.

A: Aggressive blood pressure control is indicated in people with diabetes and overt nephropathy, diabetes and confirmed microalbuminuria, or diabetes with other renal disease.

A: People with diabetes and overt nephropathy or diabetes with confirmed microalbuminuria should be started on an ACE-inhibitor or A2 receptor-blocker (if there are no contraindications) irrespective of blood pressure levels.

A: Most of the treatment benefit is achieved by reaching the following blood pressure levels:

- 140/85 mm Hg in people without clinical cardiovascular disease
- 130/80 mm Hg in people with diabetes or cardiovascular disease.

A: A blood pressure lower than 130/80 mm Hg is preferable for people with diabetes and overt nephropathy or other renal disease.

Diagnostic Criteria for Type 2 Diabetes, IGT and IFG

C: Two fasting venous plasma glucose results greater than or equal to 7 mmol/L on two different days are diagnostic of diabetes and do not require an oral glucose tolerance test (OGTT).

C: A random venous plasma glucose result of greater than 11 mmol/L on two different days is diagnostic of diabetes.

C: A fasting venous plasma glucose of 6.1 to 6.9 mmol/L indicates impaired fasting glycaemia and an OGTT is recommended to look for diabetes or IGT.

C: Some people with a fasting venous plasma glucose of 5.5 to 6.0 mmol/L show diabetes or IGT with an OGTT.

C: An OGTT is recommended in people with a fasting glucose of 5.5 to 6.0 mmol/L who are not of European ethnicity or who have a family history of diabetes, a past history of gestational diabetes, or the other features of the metabolic syndrome.

C: A fasting venous plasma glucose result of less than 5.5 mmol/L is normal.

GPP: HbA1c should not be used for the diagnosis of diabetes.

Cardiovascular Risk Assessment in People with Diabetes or at High Risk of Diabetes

C: All people with diabetes should be offered annual comprehensive cardiovascular risk assessments from the time of diagnosis.

C: Maori, Pacific peoples, and people from the Indian subcontinent should be offered cardiovascular risk assessment from 35 years for men and 45 years for women.

C: Men and women at higher risk of diabetes should be offered cardiovascular risk assessment from 35 years for men and 45 years for women. These people are those with one or more of the following risk factors:

- a family history of diabetes in a first-degree relative (parent or sibling)
- a personal history of gestational diabetes
- a personal history of polycystic ovary syndrome
- known IGT or IFG (see Table 21)
- obesity (BMI $\geq$30*) or truncal obesity (waist circumference $\geq$100 cm* in men or $\geq$90 cm* in women)

B: People with diabetes and overt diabetic nephropathy (albumin:creatinine ratio greater than 30 mg/mmol) or diabetes with other renal disease are classified clinically at very high risk (5-year cardiovascular risk $\geq$20%) without a cardiovascular risk calculation.

B: All other people with diabetes should have their 5-year cardiovascular risk calculated using the risk tables.

C: Certain people with diabetes or the metabolic syndrome are at increased cardiovascular risk and should be moved up one risk category as part of the cardiovascular risk assessment. These include:

- people with diabetes and microalbuminuria
- people with type 2 diabetes 10 years after diagnosis
- people with HbA1c results consistently above 8%
- people who meet the definition of the metabolic syndrome

C: Everyone with diabetes should have uric acid levels as well as renal and liver-function tests performed at the time of a cardiovascular risk assessment.

*Note: Where risk factor thresholds are given these should be interpreted as approximate guides to clinical practice only.

Dietary Interventions for People with Hyperglycaemic

A: People who are at risk of type 2 diabetes should avoid weight gain. Offer weight loss advice to people who are overweight or obese.

A: Everyone with IGT or IFG should receive intensive dietary advice. Intensive dietary advice should ideally be given in individual/group sessions with a dietitian. Physical activity should also be encouraged.

B: Encourage adults at risk of type 2 diabetes to adopt a cardioprotective dietary pattern, reduce saturated fatty acids and increase dietary fibre.

Dietary Interventions for People with Type 2 Diabetes or the Metabolic Syndrome

A: Recommend a reduction in energy intake with weight loss as the primary objective for people with diabetes or the metabolic syndrome who are overweight or obese.

A: Everyone with type 2 diabetes or the metabolic syndrome should receive intensive dietary advice. Intensive dietary advice should be given in individual/group sessions with a dietitian. Physical activity should also be encouraged.

A: Encourage people with type 2 diabetes or the metabolic syndrome to gradually adopt a cardioprotective dietary pattern. Advise a reduction in the intake of foods rich in saturated fatty acids or added sugars, and white flour bakery products.

Encourage a progressive replacement of these foods with vegetables, fruit, whole grain, high-fibre products, and dried peas and beans (legumes). Recommend an increase in the consumption of fish and include a source of polyunsaturated fat (see Table 5 in the original guideline document).

A: Interventions that are known to reduce risk factors in people without diabetes are also recommended for people with diabetes. Assess salt and alcohol consumption and provide guidance for limited use. Consider adding plant sterols/stanols to the diet.

A: For the optimal improvement of all risk factors, especially body weight and glycaemic control, employ intensive dietary interventions that include continuous education, behaviour modification, goal setting, and intensive monitoring.

C: Identify and recommend qualitative dietary changes based on the habitual dietary pattern, and then progress to quantitative advice to promote the development of a structured eating plan.

A: Specific dietary advice for people with diabetes and the metabolic syndrome includes advice about the saturated fatty acid content of foods and the quality of carbohydrate choices to encourage a high-fibre intake of more than 40 g daily (see Table 4 in the original guideline document).

A: To control postprandial hyperglycaemia the following advice is recommended:

- include high-fibre foods with a low to moderate glycaemic index at each meal
- distribute carbohydrate foods evenly throughout the day
- avoid a large volume of carbohydrate-rich foods at any one meal.

GPP: All people with diabetes should be referred to a dietitian.

Treatment Monitoring and Duration

GPP: Lifelong treatment is advised for people with diabetes.

GPP: People with diabetes receiving medication should have their lipids and blood pressure, glycaemic control, diet, and activity level monitored every 3 months until adequate control is achieved, then every 6 months.

GPP: Referral to a specialist for an opinion or specialist management should be considered for people with type 2 diabetes if:

- serum creatinine is greater than or equal to 0.15 mmol/L
- calculated glomerular filtration rate (GFR) is less than 60 ml/min/1.73m2
- there is a rapid increase in level of microalbuminuria or proteinuria
- there is a difficulty in achieving blood pressure targets
- in situations where non-diabetic renal disease may be present or may co-exist with diabetic renal disease:
    - there is absence of diabetic retinopathy in a person with renal disease
    - there are urinary abnormalities such as haematuria or casts (once infection has been excluded as the cause)

Medication for Cardiovascular Disease

Aspirin Use After Myocardial Infarction and Stroke

After Myocardial Infarction

A: Aspirin 75 to 150 mg/day should be given routinely and continued for life. These doses are at least as effective as higher doses.

After Stroke

A: Aspirin 75 to 150 mg/day should be given routinely after ischaemic stroke or transient ischaemic attack, unless there is an indication for anticoagulation with warfarin. These doses are at least as effective as higher doses.

C: Computed tomography (CT) scan should be obtained prior to aspirin therapy to exclude intracranial haemorrhage.

Clopidogrel Use After Myocardial Infarction and Stroke

After Myocardial Infarction

A: Clopidogrel (75 mg/day) is an effective alternative to aspirin for people with contraindications to aspirin or those who are intolerant of aspirin.

After Stroke

A: Clopidogrel (75 mg/day) can be used as a safe and effective alternative to aspirin after stroke.

Dipyridamole Use After Stroke

After Stroke

I: There is insufficient evidence to recommend dipyridamole as a first-line treatment for the secondary prevention of vascular events, either as monotherapy or in combination with aspirin.

B: Combination treatment with modified-release dipyridamole and aspirin can be used for prevention of non-fatal stroke for people at high risk of cerebral ischaemic events, including those who have symptomatic cerebral ischaemia while treated with aspirin alone.

B: Monotherapy with modified-release dipyridamole is recommended for prevention of non-fatal stroke if aspirin is contraindicated and clopidogrel is unavailable.

Warfarin Use After Myocardial Infarction and Stroke

After Myocardial Infarction

A: Warfarin should be prescribed for high-risk survivors of myocardial infarction including those with:

- atrial fibrillation or paroxysmal atrial fibrillation
- a large left ventricular aneurysm
- thrombus demonstrated in the left ventricle at the infarction site by echocardiography
- systemic embolism.

A: Warfarin should be considered for people who cannot be given antiplatelet agents after myocardial infarction.

After Stroke

A: Warfarin should not be prescribed for people with transient ischaemic attack or minor strokes unless cardiac embolism is suspected.

A: Warfarin should be considered for people after stroke associated with atrial fibrillation unless contraindicated.

C: Warfarin should be considered for people after ischaemic stroke associated with mitral valve disease, prosthetic heart valves, or within 30 days of myocardial infarction.

C: Warfarin should ideally be started in hospital. For minor stroke, it can be started after the first 48 hours or later if haemorrhage has been excluded by brain imaging. Delay for 7 to 14 days may be preferable for people after a major stroke.

After Myocardial Infarction or Stroke

A: The target international normalized ratio (INR) should be 2.5 (range 2 – 3), for most people prescribed warfarin after myocardial infarction or after ischaemic stroke associated with atrial fibrillation or mitral valve disease.

Beta-Blocker Use After Myocardial Infarction

After Myocardial Infarction

A: Beta-blockers should be considered for everyone following myocardial infarction unless there are contraindications.

A: Beta-blockers are also recommended in those with left ventricular dysfunction and heart failure.

GPP: The initial dose of beta-blockers should be low and the dose should be titrated upwards slowly.

GPP: Everyone should receive an explanation of the benefits and risks of treatment.

GPP: Beta-blockers given at night may reduce the risks of postural hypotension and alleviate symptoms of tiredness and lethargy.

GPP: Before discontinuing beta-blockers because of side effects, a lower dose or alternative beta-blocker should be tried.

GPP: If full doses of a beta-blocker and ACE-inhibitor are not tolerated, moderate doses of both are preferable to a high dose of a single agent.

ACE-Inhibitor Use After Myocardial Infarction and Stroke

After Myocardial Infarction

A: An ACE-inhibitor should be prescribed for everyone after myocardial infarction, regardless of left ventricular function. Treatment should be started early and continued long-term especially in those with anterior infarction, left ventricular dysfunction, or heart failure. Long-term ACE-inhibitor therapy should be prescribed for all people with coronary heart disease.

After Stroke

A: Blood pressure lowering medication or increased doses of current agents should be started for people presenting after an acute ischaemic stroke or transient ischaemic attack unless they have symptomatic hypotension. An ACE-inhibitor in conjunction with a thiazide diuretic is an appropriate combination.

GPP: Blood pressure targets after a stroke should take into account the number and dose of medications prescribed as well as comorbidities and general frailty.

GPP: It is advisable to wait 7 to 14 days after an acute stroke to start blood pressure lowering medication.

After Myocardial Infarction or Stroke

GPP: In general, low-dose combination therapies are good choices. Periodic monitoring of electrolytes and renal function is recommended.

Use of Lipid-Modifying Agents After Myocardial Infarction and Stroke

After Myocardial Infarction

A: A statin equivalent to simvastatin 40 mg/day should be prescribed to everyone after myocardial infarction. Statin therapy should preferably be started in hospital.

After Stroke

B: Treatment with a statin is recommended for most people following ischaemic stroke or transient ischaemic attack. Statin therapy should preferably be started in hospital.

Use of Antiarrhythmic Agents After Myocardial Infarctions

A: Antiarrhythmic therapy, apart from beta-blockers, is not recommended for routine use after myocardial infarction.

Hormone Replacement Therapy After Myocardial Infarction and Stroke

A: Combined Hormone Replacement Therapy should not be used for the prevention of coronary heart disease/stroke or after a cardiovascular event.

Calcium Channel Blocker Use After Myocardial Infarction

A: Rate-limiting non-dihydropyridine calcium channel blockers may be considered for people with normal ventricular function where beta-blockers are contraindicated and treatment is required for concurrent angina or hypertension.

Nitrate Use After Myocardial Infarction

A: Nitrates can be used after myocardial infarction for controlling symptoms of angina and heart failure, but are not indicated for reducing the risk of further events.

When to Start Therapy After Myocardial Infarction and Stroke

After Myocardial Infarction

PP: Most therapies will have been started in hospital. Some people, on review in primary care, will require initiation or dose adjustment.

After Stroke

GPP: Aspirin should be started as soon as possible after ischaemic stroke. Warfarin and statins should be started in hospital. Blood pressure lowering therapy with ACE-inhibitor and thiazide treatment should be started after 7 to 14 days.

Cardiovascular Health of Pacific People

GPP: Consider that difficult socioeconomic circumstances present significant barriers to Pacific people´s access to quality health care.

GPP: Be cognisant of the diversity and heterogeneity of the Pacific population – made up of different Pacific ethnic groups each with a distinct language and culture.

GPP: Be aware that the English language may be a barrier. Pacific ethnic-specific translators should be made available within services that provide for Pacific people.

GPP: Absolute cardiovascular risk determines treatment decisions and benefits. Within this guideline, cardiovascular risk assessment is recommended 10 years earlier for Pacific people.

GPP: Recognise the importance of the family to Pacific people. Involve family members in the management of the person´s illness and suggested dietary and lifestyle changes.

GPP: Invest in the development of Pacific ethnic-specific cardiovascular workforce and resources.

GPP: Collect quality Pacific health information (including Pacific ethnic specific data).

GPP: Support and partner with Pacific providers and Pacific communities to promote cardiovascular health for Pacific people.

Definitions:

Levels of Evidence

1++

High quality meta-analyses, systematic reviews of randomised controlled trials (RCTs), or RCTs with a very low risk of bias

1+

Well conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias

1-

Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias

2E

An economic evaluation that has used local data (in this case from New Zealand) with level 1 evidence on effectiveness of interventions from well conducted meta-analyses or RCTs

2++

High quality systematic reviews of case-control or cohort studies

High quality case-control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal

2+

Well-conducted case-control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal

2-

Case-control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal

3

Non-analytic studies (e.g., case reports, case series)

4

Expert opinion

Rating Scheme for the Strength of the Recommendations

A

The recommendation is supported by good evidence.

B

The recommendation is supported by fair evidence.

C

The recommendation is supported by non-analytic studies or consistent expert opinion.

I

The evidence is insufficient, evidence is lacking, of poor quality or opinions conflicting, the balance of benefits and harms cannot be determined.

Good Practice Point (GPP)

Recommended practice based on the clinical experience of the Guideline Development Team

CLINICAL ALGORITHM(S)

Clinical algorithms are provided in the original guideline document for:

- Effective assessment and management of cardiovascular risk
- Stepwise approach to glycaemic control in type 2 diabetes

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

There is a body of evidence that supports identifying people at high risk of cardiovascular disease and managing them accordingly. The recommendations in these guidelines are based on this evidence.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Cardioprotective Dietary Patterns

Cardioprotective dietary patterns are associated with lower cardiovascular morbidity and mortality in the general population at low or moderate cardiovascular risk and in people with cardiovascular disease.

Randomised controlled trials have demonstrated that a cardioprotective diet improves lipid profiles.

Dietary and Drug Therapy

- Dietary treatment is additive to drug therapy and can reduce cholesterol by an additional 5 to 15%. Advice on dietary patterns is integral to reducing cardiovascular risk.
- A small degree of weight loss (5–10%) in people who are overweight or obese with elevated blood pressure and at low cardiovascular risk can result in a step-down of certain blood pressure medications.

Physical Activity

- Regular physical activity is associated with reduced risk of cardiovascular disease morbidity and mortality.
- Physical activity has been shown to result in favourable changes in blood lipid profiles.

Weight Management

Voluntary and intentional weight loss is associated with reduced cardiovascular disease and diabetes-related and all-cause mortality in adults with type 2 diabetes.

Smoking Cessation

Within one day of quitting, the risk of having a myocardial infarction is reduced. The excess risk of heart disease is reduced by half after one year´s abstinence. The risk of a coronary event reduces to the level of a never smoker within 5 years. In those with existing heart disease, cessation reduces the risk of recurrent infarction or mortality by half.

Lipid Modification

Prospective studies demonstrate a constant linear relationship between relative cardiovascular risk and total cholesterol in the range of about 4 to 8 mmol/L. Within this range, treatment results in similar relative benefits regardless of baseline cholesterol levels.

- Benefits of Lipid-Modifying Drugs
    - Randomized controlled trials with statin medications have demonstrated reductions in cardiovascular disease (coronary heart disease and ischaemic stroke) morbidity, mortality, and total mortality. With the dosage regimens used in these clinical trials, reductions in risk of 30 to 50% for both coronary heart disease and ischaemic stroke have been observed.

Blood Pressure Lowering

Prospective studies demonstrate a constant linear relationship between relative cardiovascular risk and blood pressure levels of about 115/70 to 170/100 mm Hg. Within this range, treatment results in similar relative benefits regardless of the baseline blood pressure.

- Benefits of Blood Pressure Lowering Medication
    - Randomized controlled trials have shown that lowering blood pressure reduces the risk of both cardiovascular and total mortality, without adverse effect on quality of life. These trials show a similar relative reduction in coronary heart disease risk of 15 to 25% and reduction in ischaemic stroke risk of 30 to 40%. However, there have been no randomized controlled trials of blood pressure lowering in asymptomatic people without cardiovascular disease or diabetes and with blood pressure less than 150/90 mm Hg at entry.
    - Randomized controlled trials show a benefit in treating people with cardiovascular disease or diabetes irrespective of baseline blood pressure.

Antiplatelet Therapy

Aspirin

The cardiovascular benefits of low-dose aspirin outweigh the harm in people with a 5-year cardiovascular risk greater than 15%. Low-dose aspirin (75 – 150 mg/day) is as effective as higher daily doses and may be associated with less bleeding.

Other Antiplatelet Agents

When compared with aspirin in patients with pre-existing cardiovascular disease, clopidogrel reduced ischaemic stroke, myocardial infarction, or vascular death by a further 8.7% (95% confidence interval [CI], 0.3 to 16.5%, p = 0.034). People treated with clopidogrel had an annual 5.32% risk of these events compared with 5.83% of people treated with aspirin.

Benefits of Intervention in People with Diabetes, Hyperglycaemic States, or the Metabolic Syndrome

Lifestyle Interventions

People with diabetes, impaired glucose tolerance (IGT), impaired fasting glucose (IFG), or the metabolic syndrome are at higher cardiovascular risk than people without these conditions. There is now evidence that intensive lifestyle interventions (diet and physical activity) can reduce the risk of developing diabetes in those with IGT.

Weight Management

Modest weight reductions of 5 to 10% of initial body weight are associated with significant improvements in lipid abnormalities, blood pressure levels, insulin resistance, glycaemic control, and glycated hemoglobin (HbA1c). A 5-kg weight loss is recommended as an initial goal in people who are overweight or obese (body mass index [BMI] >25). Modest weight loss can be achieved and sustained.

Physical Activity

- Physical activity is a key component of weight reduction and important for weight maintenance. Moderate physical activity increases maximal oxygen uptake and cardiovascular fitness.
- Physical training improves risk factors associated with the metabolic syndrome. Aerobic physical activity, 40 to 65% of VO_2max for 20 to 45 minutes per session, 3 to 4 times weekly, is associated with increased insulin sensitivity and lowers triglyceride levels and clotting factors (plasminogen activator inhibitor and fibrinolytic activity). The addition of exercise to a weight loss programmes increases loss of intra-abdominal fat. Physical fitness is associated with lower blood pressure.
- Exercise training reduces HbA1c and increases cardiorespiratory fitness in adults with type 2 diabetes. Physical activity with an intensity of 5.5 metabolic equivalents (METs) for 40 minutes or more per week is associated with protection from the development of type 2 diabetes.

Benefits of Blood Pressure-Lowering Medication

- Randomized controlled trial evidence shows that lowering blood pressure in people with diabetes lowers cardiovascular risk. Each 10 mm Hg reduction in systolic blood pressure is associated with a 15% (95% CI; 12 to 18%) reduction in risk of cardiovascular death over 10 years. Aggressive blood pressure control is indicated in everyone with diabetes, especially those with diabetic renal disease, to achieve the reduction of both cardiovascular disease outcomes and renal complications.
- The HOPE study has shown that treatment with an angiotensin-converting enzyme (ACE)-inhibitor decreases the risk of cardiovascular disease complications in people with type 2 diabetes. These benefits are similar in people with normal and raised blood pressure and cannot be explained by blood pressure reduction alone. ACE-inhibitors are more effective than other agents in reducing urinary albumin loss. The benefit of ACE-inhibitor therapy on glomerular filtration rate is independent of blood pressure change.
- Beta-blockers are widely used in people with type 2 diabetes and have been shown to have a cardioprotective benefit in people with diabetes and cardiovascular disease. A small number of people with type 1 diabetes and hypoglycaemic episodes or autonomic neuropathy cannot tolerate beta-blockers.

Benefits of Lipid-modifying Medication

- Lipid abnormalities are common in people with type 2 diabetes. The most common type of abnormality in type 2 diabetes is a combination of elevated triglycerides, reduced high-density lipoprotein (HDL) and small dense low-density lipoprotein cholesterol (LDL-C). This small dense LDL-C composition is more atherogenic. Randomized controlled trial evidence shows that intensive lipid management in people with diabetes lowers cardiovascular risk.

Benefits for Maori

- By applying evidence-based guidelines to clinical decision-making there is potential to improve the lives of Maori individuals, their wider whanau, hapu, and iwi.

- Significant health and economic gains can be made for all New Zealanders when Maori cardiovascular health is improved.

Benefits for Pacific People

Applying evidence-based practice to the clinical decision-making process has the potential to improve health outcomes and reduce the inequalities in cardiovascular health for Pacific people.

Subgroups Most Likely to Benefit

- The protective effect of physical activity is greatest in individuals at higher risk of cardiovascular disease.
- The protective effect of long term regular physical activity is greatest in people at high risk of developing diabetes and those with a family history of diabetes. In people with impaired glucose tolerance, lifestyle interventions that include physical activity reduce the risk of developing type 2 diabetes.
- People at greater cardiovascular risk derive the most absolute benefit from blood pressure lowering treatment.

POTENTIAL HARMS

Risks of Physical Activity

There is a small, transient increase in risk of myocardial infarction or sudden death with vigorous activity in people with coronary heart disease who do not undertake regular physical activity. The risk of myocardial infarction was found to be approximately six times higher during vigorous physical activity compared to the risk at rest. The level of risk with vigorous activity depends on the individual´s baseline level of physical activity. Assessing risk prior to starting a physical activity programme and beginning with activity of a low intensity and steadily increasing duration and intensity over a couple of weeks reduce this risk.

Aspirin Therapy

Population-based observational studies have found that regular use of aspirin (at a dose of <300 mg/day) is associated with around a 2-fold increased risk of upper gastrointestinal bleeding (or perforation). The decision to use aspirin should be based on a balance of the risks and benefits for each person taking into account their absolute risk of an event.

Subgroups Most Likely to Experience Harms

Pregnant Women

The choice of drugs is restricted to those which are safe for the foetus. Methyldopa and hydralazine have been traditionally used but are commonly associated with side effects. Labetalol, some beta blockers (notably propranolol, atenolol, and oxprenolol, which have reasonable evidence of safety) and nifedipine have been used successfully in pregnancy. Thiazide diuretics, ACE-inhibitors, and A2 receptor-blockers should be avoided.

CONTRAINDICATIONS

CONTRAINDICATIONS

- Nortriptyline hydrochloride is contraindicated during the acute recovery period after myocardial infarction.
- The use of beta blockers is contraindicated in people with reversible airways obstruction (asthma and some chronic obstructive pulmonary disease [COPD]), decompensated heart failure, or heart block/bradyarrhythmia.
- Beta-blockers and rate limiting calcium channel blockers are contraindicated for secondary or tertiary heart block.
- Angiotensin-converting enzyme (ACE)-inhibitors and A2 receptor-blockers are contraindicated during pregnancy
- Aspirin is contraindicated in people with aspirin allergies or intolerance, active peptic ulceration, and uncontrolled blood pressure and in people with other major bleeding risks.
- Very low carbohydrate weight loss diets rich in saturated fatty acids and protein may be contraindicated for the treatment of insulin resistance, microalbuminuria, and elevated low density lipoprotein-cholesterol (LDL-C) and have not been tested for long-term effectiveness of weight maintenance
- The potential risks, together with the LDL-C elevating effects of high saturated fat intakes, suggest that high carbohydrate, low dietary fibre diets are contraindicated in the management of diabetes and the metabolic syndrome
- Clopidogrel is contraindicated for people with hepatic impairment or active pathological bleeding and carries a manufacturer´s precaution against its use in people with a predisposition to gastrointestinal bleeding.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

Evidence-based best practice guidelines are produced to help health practitioners, patients, and consumers make shared decisions about health care choices in specific clinical circumstances. If properly developed, communicated and implemented, guidelines can improve care. While they represent a statement of best practice based on the latest available evidence (at the time of publishing), they are not intended to replace the health practitioner´s judgment in each individual case.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

Priority Groups

The Guideline Development Team strongly supports an approach to implementation that will address past inequities in service provision and the disparities in cardiovascular outcomes that exist between ethnic groups in New Zealand. A population health approach that uses intersectoral action to address

socioeconomic, ethnic, sex, and geographic inequalities is proposed. This guideline has a personal health perspective which recognises that the attitudes, skills, and resources available to individual providers of care can also reduce inequalities and potentially improve the health of all New Zealanders. Practitioners have an important role in identifying disadvantage among individuals and groups, identifying barriers to access for those who are disadvantaged, recording ethnicity accurately, and being sensitive to cultural requirements.

There is a danger that any organised programme of risk assessment will preferentially serve those with the least need or lowest risk (the inverse care law). This risk is greatest with an opportunistic screening strategy, and there is evidence that screening programmes achieve lower coverage of Maori despite the increased risk. The New Zealand criteria to assess screening programmes specify in criterion six that "any screening programme reaches those who need it most, which may require specific initiatives to reach particular population groups." This guideline offers advice at an individual level to providers of health care and recommends that implementation proceeds first for the priority groups, Maori, Pacific peoples, and in the geographical areas of New Zealand with the highest rates of cardiovascular disease.

Maori and Implementation

A key message of this guideline is that cardiovascular risk assessment and management should be prioritised to high-risk groups. The guideline recommends that Maori are assessed for cardiovascular risk 10 years earlier than non-Maori (i.e., from the age of 35 years for Maori men and 45 years for Maori women). There is an urgent need to focus intervention programmes on Maori, who bear the greatest burden of cardiovascular disease in New Zealand. Promoting change at three levels: policy, systems and practitioner/patient levels is required.

Implementation of the Maori Cardiovascular Action Plan

The Maori Cardiovascular Group has identified several categories of action with the overall aim of improving Maori cardiovascular health and removing inequalities in cardiovascular disease outcomes between Maori and non-Maori in New Zealand. The actions proposed are:

1. policy: Treaty of Waitangi-based policy and decision-making
2. information systems: complete and consistent collection of ethnicity data and service provider funding
3. access, delivery, and standards development: cardiovascular health needs assessment and kaupapa Maori health services
4. audit, evaluation, and quality standards improvement: measurement of key performance indicators to monitor service responsiveness to Maori cardiovascular need.

Implementation of the Guideline

For this guideline to be successfully implemented for Maori, the implementation process must:

- prioritise Maori cardiovascular health gain
- address the Treaty of Waitangi and indigenous rights
- promote equity in the provision and use of health services
- consult Maori stakeholders and communities
- use Maori health models
- audit and evaluate the implementation process

If cardiovascular health services and programmes are to be accessible and effective for Maori, planning and priority setting will need to be undertaken.

Pacific Peoples

The Pacific Cardiovascular Working Party has drafted a Cardiovascular Health Action Plan that has stated a goal to reduce the incidence and impact of cardiovascular disease in Pacific peoples in New Zealand. This is published separately and includes the following objectives:

- to reduce the incidence and impact of cardiovascular disease for Pacific peoples within each District Health Board (DHB) and to provide tools to enable this process
- to improve access for Pacific peoples to mainstream cardiovascular disease services, Primary Health Care Organisations (PHOs), and other Pacific providers
- to influence the development of the Pacific cardiovascular disease workforce
- to encourage and support healthy lifestyles for Pacific peoples
- to influence other Government agencies that have policies that affect and impact on Pacific people´s cardiovascular health

Important actions suggested include ensuring that PHOs and other health promotion providers develop and implement culturally competent models for Pacific peoples that encourage and support healthy lifestyles, which include nutrition, physical activity, and smoke-free advice. Health promotion activities and materials should recognise the unique cultural differences of Pacific peoples.

Implementation Plan

The Guideline Development Team recommends that the following multifaceted strategies are adopted to disseminate the guideline and encourage its implementation through New Zealand. There is evidence that information transfer and learning through social influence and management support can be effective in implementing guidelines and innovations in general practice, as can reminders and feedback. Information exchange is probably always required, but additional interventions are usually needed to achieve real change in practice routines. Cardiovascular risk assessments can be made using simple paper-based or electronic risk-prediction tools, and many of these are now available, predicting different outcomes over different time periods using different risk factor combinations. There is increasing evidence that paper-based or electronic tools are usable in clinical practice and lead to improved risk management. Important features of electronic decision support are the ease of use and the integration of tools into the electronic medical record so that they are only a mouse click away. The relevance and accuracy of messages and the flexibility to respond to other

factors influencing decision-making have been identified as key factors in implementing electronic decision support tools in primary care.

Specific Distribution Strategies

- Endorsement
    - Endorsement for the guideline was sought from stakeholder organisations with an interest in promoting the key messages. At the start of the process a number of organisations nominated team members to be part of the Guideline Development Team and endorsement from these organisations was sought after they had reviewed an advanced copy of the final guideline.
- Quick Reference Guide
    - A quick reference guide including the key messages from the guideline is to be prepared and distributed to all primary care practitioners and included in key primary care magazines and publications.
- Publication in Full
    - This is to be available electronically at the New Zealand Guidelines Group (NZGG) Web site (www.nzgg.org.nz) at no charge and will be circulated to DHBs, Independent Practitioner Organisations (IPAs), PHOs, Local Diabetes Teams (LDTs), and pharmacy facilitators. The NZGG Web site will also provide downloadable supporting information, quizzes, video clips, and evidence tables for people seeking more detail.
- Dissemination
    - Further dissemination is planned to reach all primary care practitioners. The following groups will also receive a summary document and the quick reference guide: national regulatory bodies, Medical and Nursing Colleges, IPAs, PHOs, DHBs and LDTs, other provider organisations, dietitians, pharmacists, support groups, consumer and interest groups, commercial organisations and drug companies.
    - There is a need for a coordinated marketing campaign to advise people of the benefits of a risk assessment and to develop an awareness of ways they can reduce their risk through lifestyle modification. Agencies including the Ministry of Health, PHARMAC, and the Ministry of Sport and Recreation should coordinate these programmes to proactively promote lifestyle change.

Events, Presentations and Training

- National and Local Events
    - The launch of the guideline will attract media interest and signal the start of the implementation phase. The launch will coincide with the launch of the New Zealand diabetes and stroke guidelines. Further opportunities for presentation at local postgraduate education meetings will help health care practitioners become familiar with the guideline.
- Local Feedback Adaptation
    - This will be encouraged through presentations by members of the Guideline Development Team at local general practitioners´ peer review meetings and as part of PHO project planning initiatives. A

clinical focus will be maintained through case studies and scenario-based teaching strategies.

- Education Initiatives
  - The guideline and supplementary resources will be freely available for use in the education and training of pharmacy facilitators, general practitioners, nurse practitioners, nurses, and pharmacists. Best Practice Advocacy Centre (BPAC) plans to run a series of case studies based on the guidelines. Other opportunities for Web-based learning and the provision of continuing medical education (CME) points for courses completed will be investigated.
- Champions
  - Local champions should be identified by DHBs and resources provided (PowerPoint presentations, full guidelines, pre-prepared case studies, etc.) to support them in developing local, comprehensive, and high-quality cardiovascular risk assessment services. Expert members of the guideline team will be invited to prepare articles and publications for local and international journals and publications.
- Audit
  - DHBs should audit the referral patterns, medication prescribing, outcomes, and process indicators from risk-assessment programmes by PHOs. Audit is seen as a key quality improvement activity to promote a change in practice and uptake of the guideline.

Performance Indicators

Refer to Appendix A for system quality and clinical performance indicators.

Practical Tools, Electronic Decision Support

The National Heart Foundation´s cardiovascular risk tables are already widely distributed in primary care. Further copies will be printed to accompany the guideline and will be included in consumer resources.

Electronic decision support tools are available in New Zealand and a process for incorporating the additional or changed messages from this guideline will be developed.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Living with Illness
Staying Healthy

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

New Zealand Guidelines Group (NZGG). The assessment and management of cardiovascular risk. Wellington (NZ): New Zealand Guidelines Group (NZGG); 2003 Dec. 190 p. [705 references]

ADAPTATION

NZGG approached the Scottish Intercollegiate Guidelines Network (SIGN) for permission to adapt SIGN guidelines to New Zealand circumstances, including changes to recommendations where the guidelines development team considered these necessary. The specific guidelines that were adapted were the Hypertension in Older People (SIGN 49), The Management of Diabetes (SIGN 55), and Secondary Prevention of Coronary Heart Disease following Myocardial Infarction (SIGN 41). Permission was generously granted. The developers of the other international guidelines were also approached for permission to adapt their guidelines as necessary.

DATE RELEASED

2003 Dec

GUIDELINE DEVELOPER(S)

New Zealand Guidelines Group - Private Nonprofit Organization

SOURCE(S) OF FUNDING

Ministry of Health

GUIDELINE COMMITTEE

Guideline Development Team

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Declaration of Competing Interests

Professor Jim Mann has received financial support towards conference travel and research projects from the following pharmaceutical companies:

- Merck Sharp and Dohme
- Roche
- Novo Nordisk
- Novartis
- Bristol Myers Squibb/Mead Johnson

He is a participant in the Navigator Study of Nateglinide in the prevention of type 2 diabetes but none of the other support has been for trials of drugs. He has not been a consultant to any pharmaceutical company nor received any personal remuneration from a pharmaceutical company.

Associate Professor Bruce Arroll is on the primary care committee for the future forum funded by AstraZeneca and has received financial support from the New Zealand office of Eli Lilly.

Professor Rod Jackson has received research and development funding from:

- Health Research Council of New Zealand
- National Heart Foundation of New Zealand
- Accident Compensation Corporation (ACC)
- Alcohol Advisory Council of New Zealand
- Ministry of Health
- ProCare
- South Auckland Health

Professor Jackson has been paid for teaching sessions, received fees or travel support from:

- PHARMAC
- ADIS Press
- Royal Australasian College of Surgeons
- Aviation Medical Society of Australia and New Zealand
- Civil Aviation Authority
- American Society of Hypertension
- World Heart Federation
- Merck Sharp and Dohme sponsored "State of the Nation´s Health Forum"

Dr Stewart Mann has received research funding, travel support or has acted as a consultant for the New Zealand offices of the following pharmaceutical companies:

- Roche
- AstraZeneca
- GlaxoSmithKline.

Dr Diana North has acted as a consultant for the Roche pharmaceutical company.

Professor Russell Scott has received research funding, travel support or has acted as a consultant for the New Zealand and international offices of the following pharmaceutical companies:

- Merck Sharp and Dohme
- Roche
- GSK Diabetes
- Abbott
- Eli Lilly

Professor Harvey White has received research funding, travel support or has acted as a consultant for the following pharmaceutical companies:

- Merck Sharp and Dohme
- AstraZeneca

Associate Professor Tim Maling is chair of the Analgesic Advisory Board of GSK Diabetes.

Professor Norman Sharpe has received funding or has acted as a consultant for the New Zealand or international offices of the following companies:

- Aventis
- Roche
- Merck Sharp and Dohme
- AstraZeneca
- Wyeth Ayerst
- Eli Lilly

The remaining members of the Guideline Development Team did not report any competing interests.

ENDORSER(S)

Australasian Faculty of Public Health Medicine - Professional Association
Cardiac Society of Australia and New Zealand
Nurses Society of New Zealand - Professional Association
Royal Australasian College of Physicians - Professional Association
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Royal New Zealand College of General Practitioners - Medical Specialty Society
Sports & Recreation New Zealand - Professional Association

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the New Zealand Guidelines Group Web site.

Print copies: Available from the New Zealand Guidelines Group Inc., Level 30, Grand Plimmer Towers, 2-6 Gilmer Terrace, PO Box 10-665, Wellington, New Zealand; Tel: 64 4 471 4188; Fax: 64 4 471 4185; e-mail: info@nzgg.org.nz.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- New Zealand Guidelines Group (NZGG). General summary. The assessment and management of cardiovascular risk. Wellington (NZ): New Zealand Guidelines Group (NZGG); 2003 Dec. 7 p. Available from in Portable Document Format (PDF) from the New Zealand Guidelines Group Web site.
- New Zealand Guidelines Group (NZGG). National Cardiovascular Advisory Group. Terms of Reference. Wellington (NZ): New Zealand Guidelines Group (NZGG); 2000 Dec. 4 p. Available from in Portable Document Format (PDF) from the New Zealand Guidelines Group Web site.
- New Zealand Guidelines Group (NZGG). Issues and clinical questions for the Hub Group. "Screening, risk assessment, prevention and management of cardiovascular disease" guideline. Wellington (NZ): New Zealand Guidelines Group (NZGG); 2002 Nov. 24 p. Available from in Portable Document Format (PDF) from the New Zealand Guidelines Group Web site.

- Doughty C. What is the value of a family history of premature cardiovascular disease in predicting increased risk of cardiovascular disease? A critical appraisal of the literature presented in evidence tables. Christchurch (NZ): New Zealand Health Technologies Assessment. 2003 Jan 10. 49 p. Available from in Portable Document Format (PDF) from the New Zealand Guidelines Group Web site.
- Broadstock M. What clinical features best determine insulin resistance? A critical appraisal of the literature presented in evidence tables. Christchurch (NZ): New Zealand Health Technologies Assessment. 2002 Dec 3. 25 p. Available from in Portable Document Format (PDF) from the New Zealand Guidelines Group Web site.
- Hall K. What is the prognostic value of calcium scoring in screening asymptomatic populations for cardiovascular disease? A critical appraisal of the literature presented in evidence tables. Christchurch (NZ): New Zealand Health Technologies Assessment. 2003 Feb 3. 25 p. Available from in Portable Document Format (PDF) from the New Zealand Guidelines Group Web site.

Print copies: Available from the New Zealand Guidelines Group Inc., Level 30, Grand Plimmer Towers, 2-6 Gilmer Terrace, PO Box 10-665, Wellington, New Zealand; Tel: 64 4 471 4188; Fax: 64 4 471 4185; e-mail: info@nzgg.org.nz.

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI on June 21, 2004. The information was verified by the guideline developer on July 19, 2004.

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